TEST REPORT

Test Report No. : UL-RPT-RP14394930-516A

Customer	:	VEGA Grieshaber KG
Model No.	:	VEGAPULS 6X
FCC ID	:	O6QPS6XW
Technology	:	Level Probing Radar
Test Standard(s)	:	FCC Parts 15.207, 15.209(a) & 15.256(h)
Test Laboratory	:	UL International (UK) Ltd, Basingstoke, Hampshire, RG24 8AH, United Kingdom

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 05 December 2022

Checked by:

Ben Mercer
Lead Project Engineer, Radio Laboratory

Company Signatory:

Sarah Williams
RF Operations Leader, Radio Laboratory

5772

Customer Information

Company Name:	VEGA Grieshaber KG
Address:	Am Hohenstein 113, D-77761 Schiltach Germany

Report Revision History

Version Number	Issue Date	Revision Details	Revised By
1.0	25/11/2022	Initial Version	Ben Mercer
2.0	05/12/2022	Antenna gains updated	Ben Mercer

Table of Contents

1 Attestation of Test Results

1.1 Description of EUT

The equipment under test was a radar sensor for the continuous level measurement of liquids.

1.2 General Information

Specification Reference:	47CFR15.256
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Section 15.256
Specification Reference:	47CFR15.207 & 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Sections 15.207 & 15.209
Site Registration:	685609
Lab Designation No.:	UK2011
Location of Testing:	Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, G24 8AH, United Kingdom
Test Dates:	02 September 2022 to 04 November 2022

1.3 Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.256(h) & 15.209(a)	Transmitter Unwanted Emissions	✓
Part 15.207	Transmitter AC Conducted Emissions	✓

Key to Results

✓ = Complied ✗ = Did not comply

1.4 Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

2 Summary of Testing

2.1 Facilities and Accreditation

The test site and measurement facilities used to collect data are located at Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom. The following table identifies which facilities were utilised for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

Site 1	X
Site 2	-
Site 17	X

UL International (UK) Ltd is accredited by the United Kingdom Accreditation Service (UKAS). UKAS is one of the signatories to the International Laboratory Accreditation Co-operation (ILAC) Arrangement for the mutual recognition of test reports. The tests reported herein have been performed in accordance with its terms of accreditation.

2.2 Methods and Procedures

Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	KDB 890966 D01 Level Probing Radar v01r01 September 10, 2014
Title:	Measurement Procedure for Level Probing Radars
Reference:	KDB 174176 D01 Line Conducted FAQs v01r01 June 3, 2015
Title:	AC Power-Line Conducted Emissions Frequenctly Asked Questions

2.3 Calibration and Uncertainty

Measuring Instrument Calibration

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

Measurement Uncertainty & Decision Rule

Overview

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

Decision Rule

The decision rule applied is based upon the accuracy method criteria. The measurement uncertainty is met and the result is considered in conformance with the requirement criteria if the observed value is within the prescribed limit.

Measurement Uncertainty

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Radiated Emissions	30 MHz to 1 GHz	95%	±3.30 dB
Radiated Emissions	1 GHz to 40 GHz	95%	±3.16 dB
Radiated Emissions	40 GHz to 200 GHz	95%	±5.12 dB
Transmitter AC Conducted Emissions	0.15 MHz to 30 MHz	95%	±1.96 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

2.4 Test and Measurement Equipment

Test Equipment Used for Transmitter Radiated Emissions Tests

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2040	Thermohygrometer	Testo	608-H1	45124934	09 Dec 2022	12
K0001	3m RSE Chamber	Rainford Solutions	N/A	N/A	05 Sep 2023	12
M2044	Test Receiver	Rohde & Schwarz	ESU26	100122	29 Apr 2023	12
A3165	Loop Antenna	ETS-Lindgren	6502	224383	05 May 2023	12
A3154	Pre-Amplifier	Com-Power	PAM-103	18020012	18 Aug 2023	12
A3112	Attenuator	AtlanTecRF	AN18-06	219706#2	23 Nov 2022	12
A553	Bi-Log Antenna	Chase EMC	CBL6111A	1593	23 Nov 2022	12
K0017	3m RSE Chamber	Rainford Solutions	N/A	N/A	26 Oct 2022	12
M2003	Thermohygrometer	Testo	608-H1	45046641	09 Dec 2022	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	12 Oct 2022	12
A3265	Pre-Amplifier	Schwarzbeck	BBV 9721	9721-069	03 Nov 2022	12
A2892	Horn Antenna	Schwarzbeck	BBHA 9170	9170-727	02 Nov 2022	12
A2948	Pre-amplifier	Com-Power	PAM-118A	551087	20 Oct 2022	12
A2889	Horn Antenna	Schwarzbeck	BBHA 9120 B	653	26 Oct 2022	12
A2890	Horn Antenna	Schwarzbeck	HWRD 750	14	29 Oct 2022	12
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	14 Nov 2023	12
M1832	Signal Analyzer	Keysight	N9010A	MY53470303	30 Jun 2023	24
M2065	Downconverter	Virginia Diodes	WR10SAX	SAX 393	30 Jul 2023	24
A2967	Horn Antenna	Link Microtek	AM10HA-ULV1	14933	13 Jul 2025	36
A2964	Horn Antenna	Link Microtek	AM15HA-ULV1	14930	24 Jun 2025	36
M2069	Downconverter	Virginia Diodes	WR15SAX	SAX 394	09 Jul 2023	24
A219915	Downconverter	Virginia Diodes	WR19SAX	SAX 897	14 Apr 2023	12
A2963	Horn Antenna	Link Microtek	AM19HA-ULV1	14929	20 Jun 2025	36
M2066	Downconverter	Virginia Diodes	WR6.5SAX	SAX 392	31 May 2024	24
A2968	Horn Antenna	Link Microtek Ltd.	AM7HA-ULV1	14934	04 Feb 2023	12
M2067	Downconverter	Virginia Diodes	WR4.3SAX	SAX 391	31 May 2024	24
A2969	Horn Antenna	Link Microtek	AM4HA-ULV1	14935	04 Feb 2023	12

Test and Measurement Equipment (continued)

Test Equipment Used for Transmitter AC Conducted Spurious Emissions:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2037	Thermohygrometer	Testo	608-H1	45124925	08 Dec 2022	12
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	01 Sep 2023	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	31 May 2023	12
M1273	Test Receiver	Rohde & Schwarz	ESIB26	100275	25 Nov 2022	12
A215746	Variable DC Power Supply	Rohde & Schwarz	NGSM 32/10	192.0810.31	Cal before use	-
M1251	Digital Voltmeter	Fluke	175	89170179	19 May 2023	12

Test Measurement Software/Firmware Used:

Name	Version	Release Date
Rohde & Schwarz EMC32	6.30.0	2018

3 Equipment Under Test (EUT)

3.1 Identification of Equipment Under Test (EUT)

Brand Name:	VEGAPULS
Model No.:	VEGAPULS 6X
Test Sample Serial Number:	58644148 (Radiated sample #1)
Hardware Version:	1.1.0
Software Version:	1.1.0
FCC ID:	O6QPS6XW

3.2 Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.3 Additional Information Related to Testing

Technology Tested:	Level Probing Radar	
Type of Unit:	Transceiver	
Modulation:	FMCW	
Power Supply Requirement(s):	Nominal	24.0 VDC
Transmit Frequency Range:	75 GHz to 85 GHz	
Transmit Channels Tested:	**Channel Bandwidth (GHz)**	**Channel Frequency (GHz)**
	8	80.000

3.4 Description of Available Antennas

The radio utilizes various external antennas, with the following maximum gains:

ID	Model Number	Type	Frequency Range (MHz)	Antenna Gain (dBi)
1	VEGAZW-6-83952	PVDF Thread 1 ½”	75000 to 85000	24.9
11	VEGAZW-6-83998	Horn Antenna 3”	75000 to 85000	33.0
14	VEGAZW-6-83999	Horn Antenna 3” (High Temperature)	75000 to 85000	28.8

3.5 Description of Test Setup

Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	240 Litre Tank
Brand Name:	Speidel
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	DC Power Supply (UL Asset S0537)
Brand Name:	TTI
Model Name or Number:	EL302D
Serial Number:	249928

Operating Modes

The EUT was tested in the following operating mode(s):

- Transmitting at maximum power on the widest supported chirp bandwidth with FMCW modulation.

Configuration and Peripherals

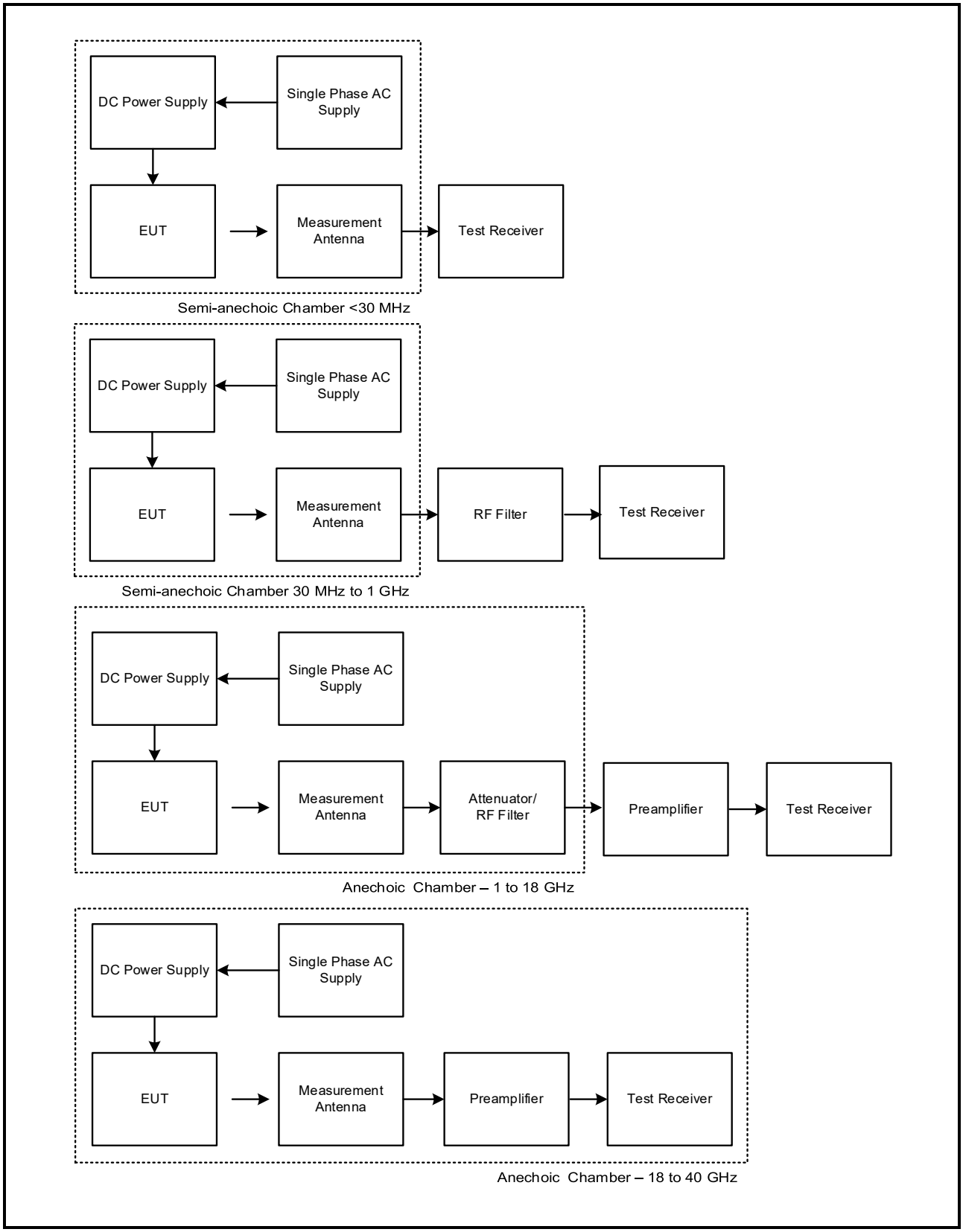
The EUT was tested in the following configuration(s):

- The EUT was configured using the built-in user interface. The chirp bandwidth was set by varying the ‘maximum measurement distance’ setting.
- The EUT was powered via a 24 VDC bench power supply connected to a 120 VAC 60 Hz mains supply.
- Radiated Transmitter Unwanted Emissions were performed with the EUT in the position that produced the worst case with respect to emissions. No accessories/peripherals were employed during tests as there were no ports on the EUT to populate.
- Radiated Transmitter Unwanted Emissions were performed with the EUT transmitting an 8 GHz chirp bandwidth, as preliminary investigation showed this to be the worst case with respect to emissions.
- The EUT can be supplied with a range of antennas. Testing was performed on the highest gain antenna of each type.
- AC Conducted Emissions tests were performed with the EUT installed in a representative metal tank. Installation within a representative tank was deemed to have no impact on conducted emissions compared to free space installation.

Test Setup Diagrams

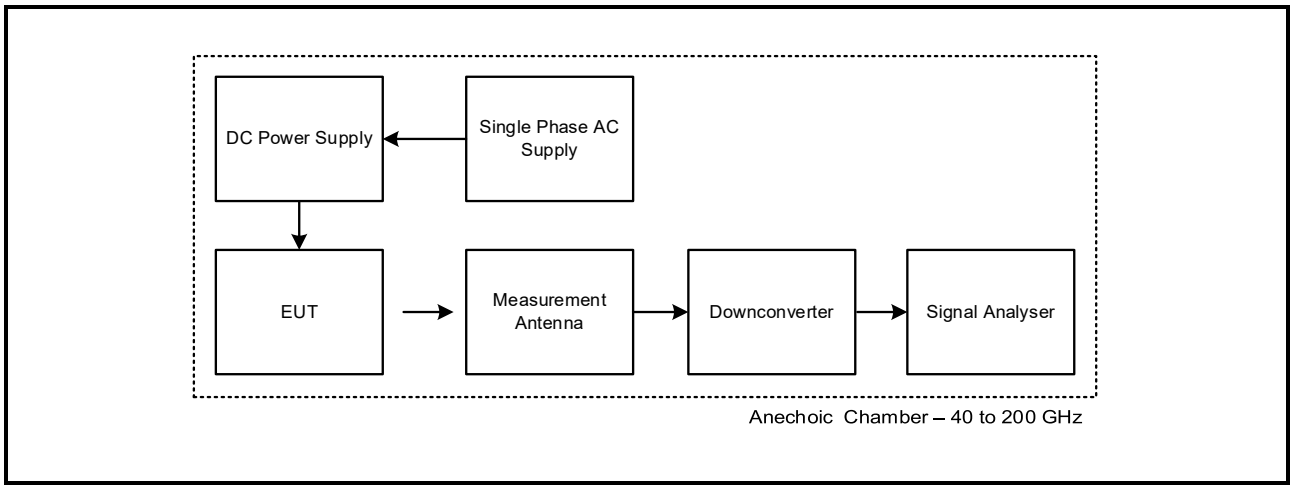
Radiated Tests:

Test Setup for Transmitter Radiated Emissions

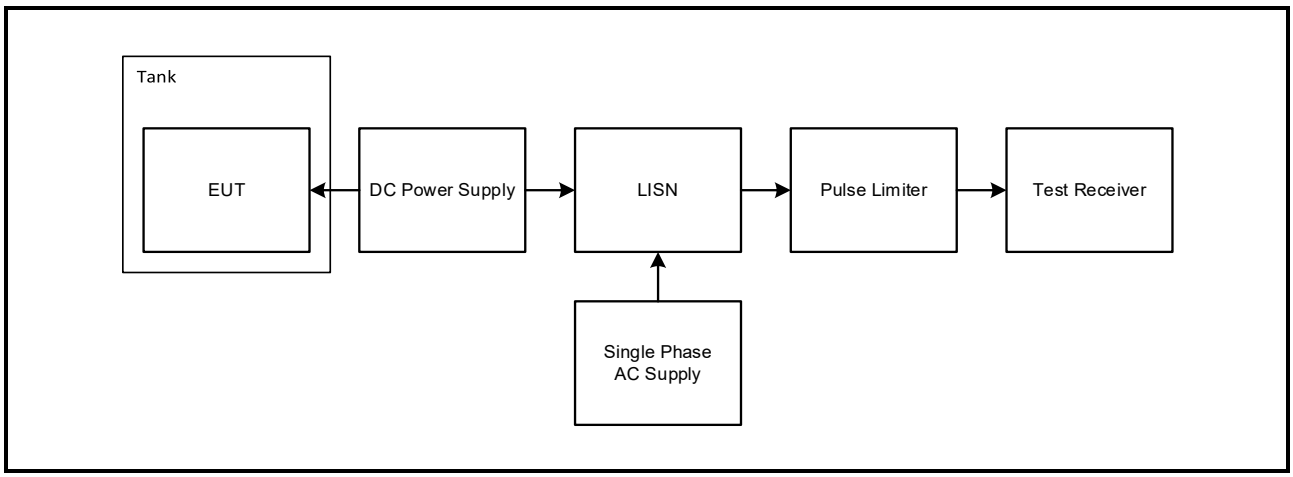


Test Setup Diagrams (continued)

Test Setup for Transmitter Radiated Emissions (continued)



Test Setup for Transmitter AC Conducted Spurious Emissions



4 Radiated Test Results

4.1 Transmitter Radiated Emissions <1 GHz

Test Summary:

Test Engineers:	Vi Van & John Ferdinand	**Test Dates:**	02 October 2022 & 04 November 2022
Test Sample Serial Number:	58644148		

FCC Reference:	Part 15.256(h) & 15.209(a)
Test Method Used:	KDB 890966 Section G & ANSI C63.10 Sections 6.3, 6.4 and 6.5
Frequency Range	9 kHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	22 to 23
Relative Humidity (%):	48

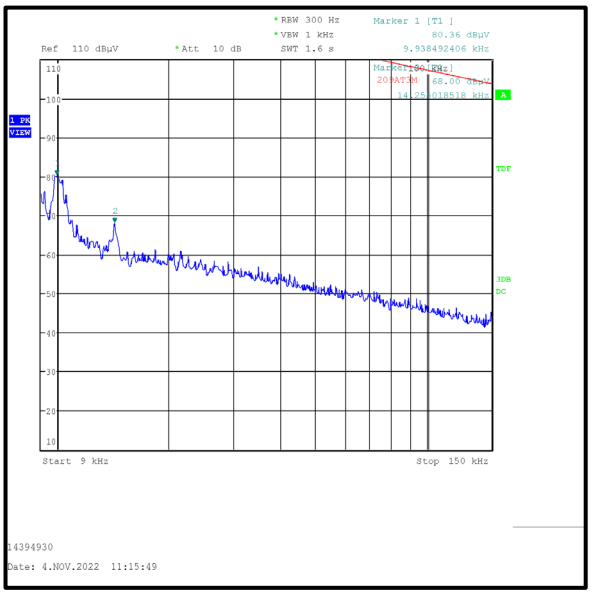
Note(s):

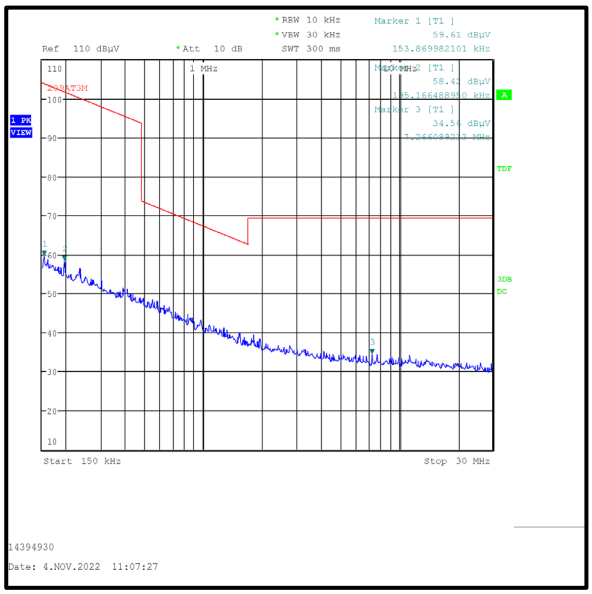
1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scans were investigated and found to be ambient, or > 20 dB below the appropriate limit or below the noise floor of the measurement system.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
4. Pre-scans were performed and markers placed on the highest measured levels. The test receiver was configured as follows: For 9 kHz to 150 kHz, the resolution bandwidth was set to 300 Hz and video bandwidth 1 kHz. A peak detector was used and trace mode was Max Hold. For 150 kHz to 30 MHz, the resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz, trace mode was Max Hold. For 30 MHz to 1 GHz, the resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
5. Pre-scans were performed with each antenna. Emission frequencies and amplitudes did not vary between antennas, therefore final measurements were performed on the PVDF Thread 1 ½" antenna.
6. Final measurements were performed on the marker frequencies and the results entered into the table below. The test receiver resolution bandwidth was set to 120 kHz, using a CISPR quasi-peak detector and span wide enough to see the whole emission.

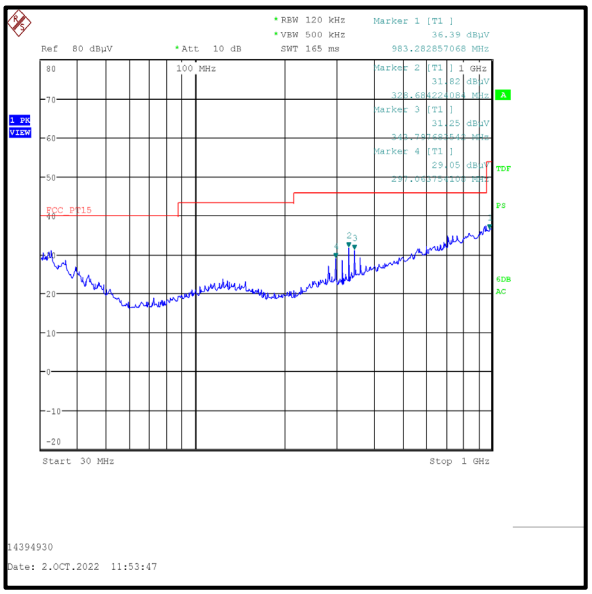
Transmitter Radiated Emissions (continued)

Results:

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
279.982	Horizontal	25.4	46.0	20.6	Complied
296.006	Horizontal	27.5	46.0	18.5	Complied
312.009	Horizontal	29.6	46.0	16.4	Complied
327.995	Horizontal	30.4	46.0	15.6	Complied
344.022	Horizontal	29.2	46.0	16.8	Complied
360.007	Horizontal	28.8	46.0	17.2	Complied







Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

4.2 Transmitter Radiated Emissions >1 GHz

Test Summary:

Test Engineer:	Vi Van	**Test Dates:**	02 September 2022 to 11 September 2022
Test Sample Serial Number:	58644148		

FCC Reference:	Part 15.256(h) & 15.209(a)
Test Method Used:	KDB 890966 Section G & ANSI C63.10 Sections 6.3 and 6.6
Frequency Range	1 GHz to 200 GHz

Environmental Conditions:

Temperature (°C):	23 to 24
Relative Humidity (%):	48 to 55

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scans were investigated and found to be ambient, or > 20 dB below the appropriate limit or below the noise floor of the measurement system.
3. In accordance with Part 15.256(l)(5), the Part 15.35(b) & (c) provisions that require emissions to be averaged over a 100 ms period and that limit the peak power to 20 dB above the average limit have not been applied.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT.
5. Final measurements between 1 GHz and 40 GHz were performed in a fully anechoic chamber (Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
6. Measurements above 40 GHz were performed in accordance with ANSI C63.10 Clause 9.12. Exploratory scans were performed in both azimuth and elevation with the analyser sweep time set to auto. Pre-scan were repeated at the maximised orientation using a long sweep time to minimise the impact of mixing products.
7. Measurement distances above 40 GHz were determined according to ANSI C63.10 Clause 9.8. Measurement distances were reduced until 6 dB noise floor clearance was achieved:

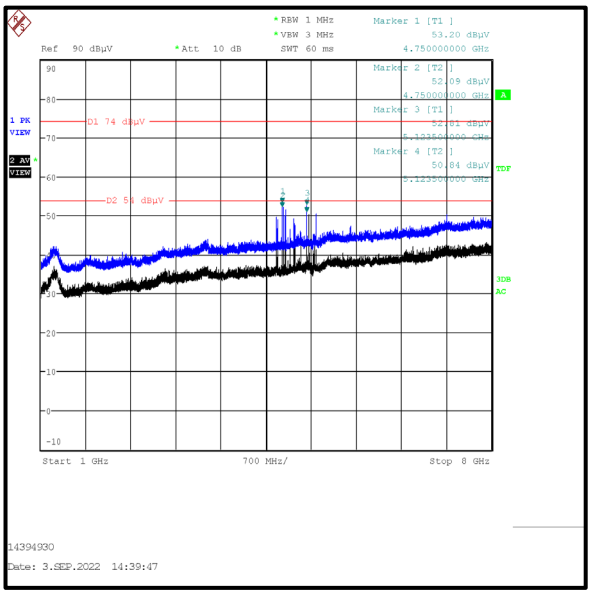
40-50 GHz – 1.0 metres
50-75 GHz – 1.0 metres
75-110 GHz – 1.0 metres
110-170 GHz – 0.5 metres
170-200 GHz – 0.5 metres

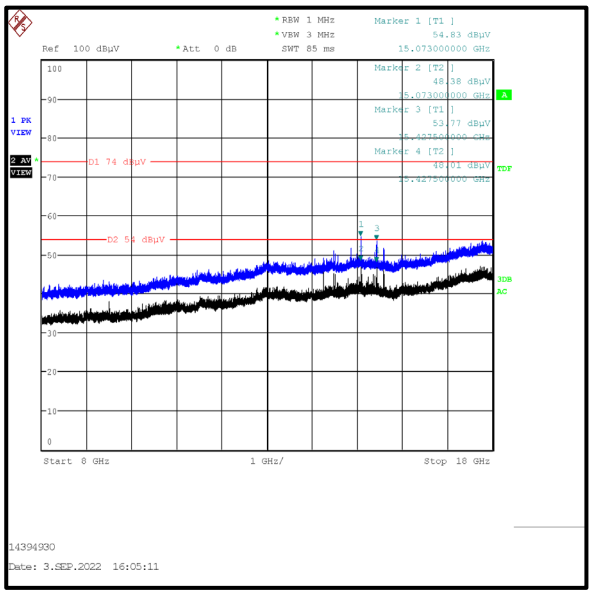
Transmitter Radiated Emissions (continued)

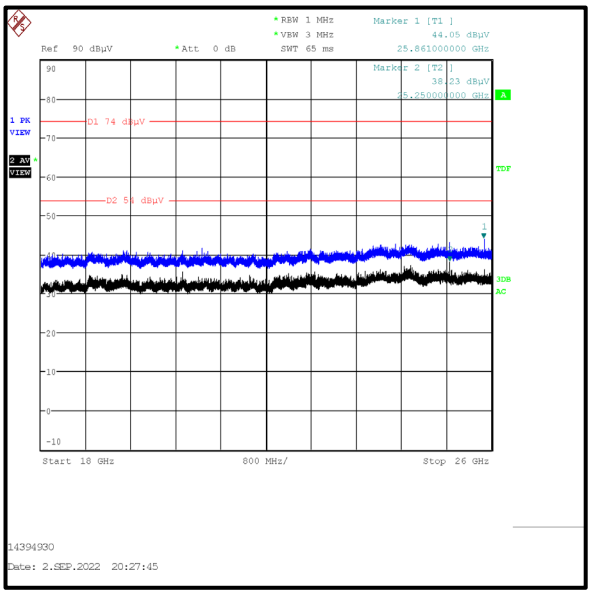
Results: Antenna 1 / Average

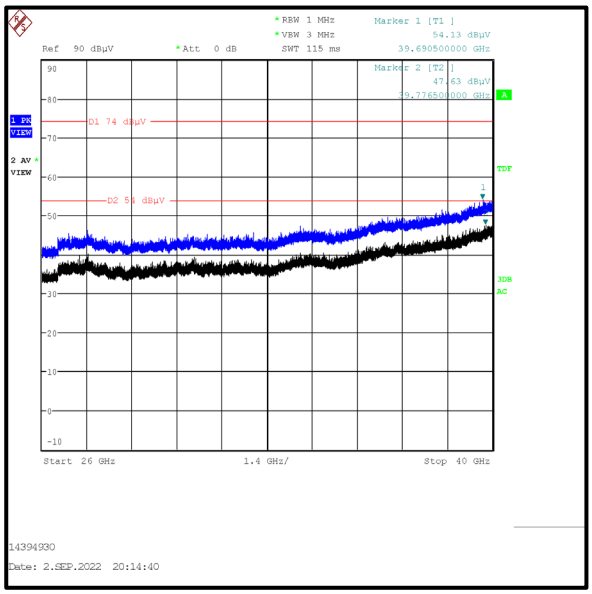
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4750.031	Vertical	38.4	54.0	15.6	Complied
5249.999	Vertical	33.6	54.0	20.4	Complied
14250.022	Vertical	41.8	54.0	12.2	Complied
15750.104	Vertical	37.4	54.0	16.6	Complied
25248.448	Vertical	31.3	54.0	22.7	Complied
74460.857	Vertical	43.6	54.0	10.4	Complied
85672.500	Vertical	46.6	54.0	7.4	Complied
90968.361	Vertical	46.8	54.0	7.2	Complied
151999.713	Vertical	45.9	54.0	8.1	Complied

Transmitter Radiated Emissions (continued)









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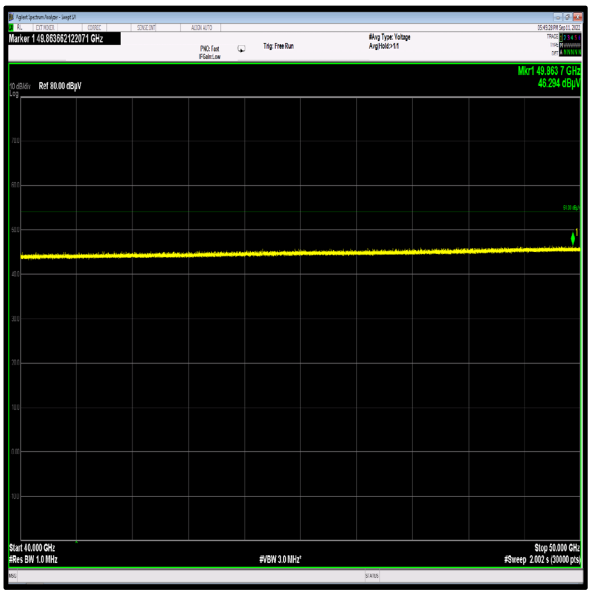
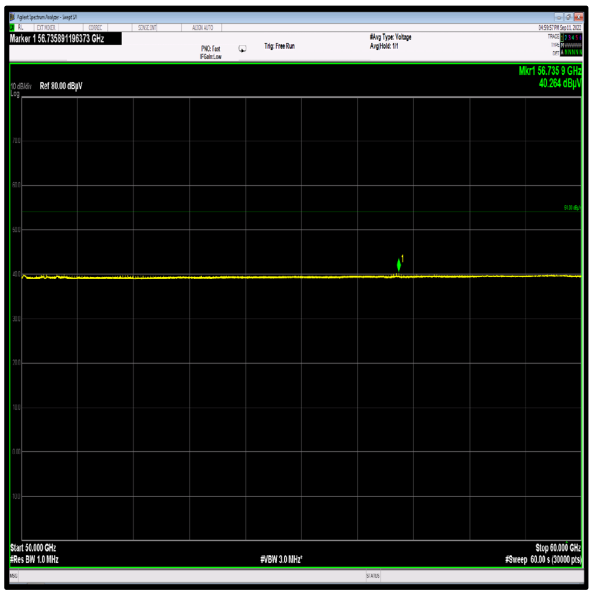
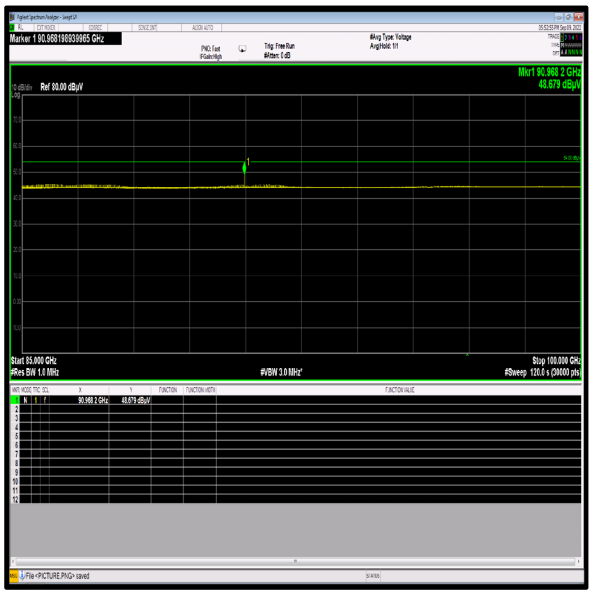
Transmitter Radiated Emissions (continued)







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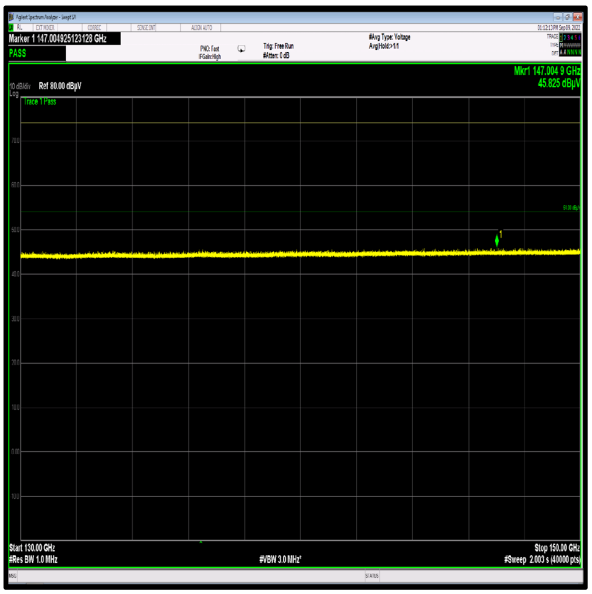
Transmitter Radiated Emissions (continued)



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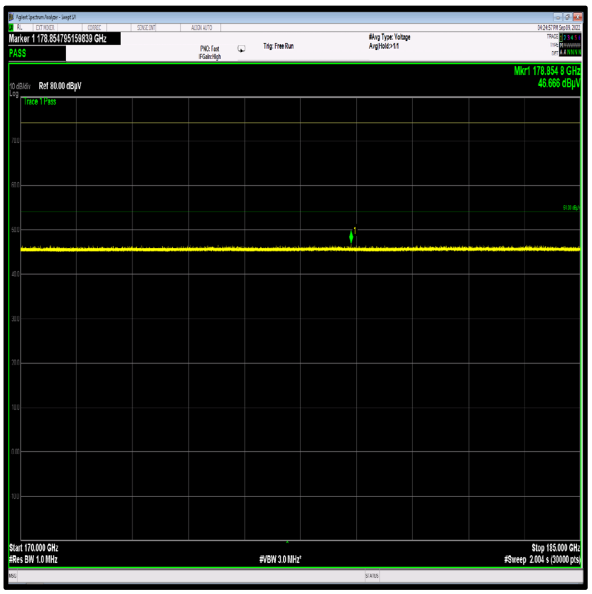
Transmitter Radiated Emissions (continued)



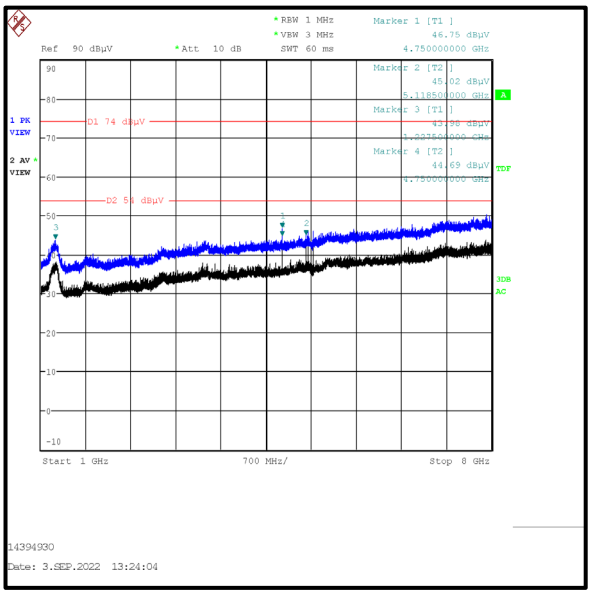
Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

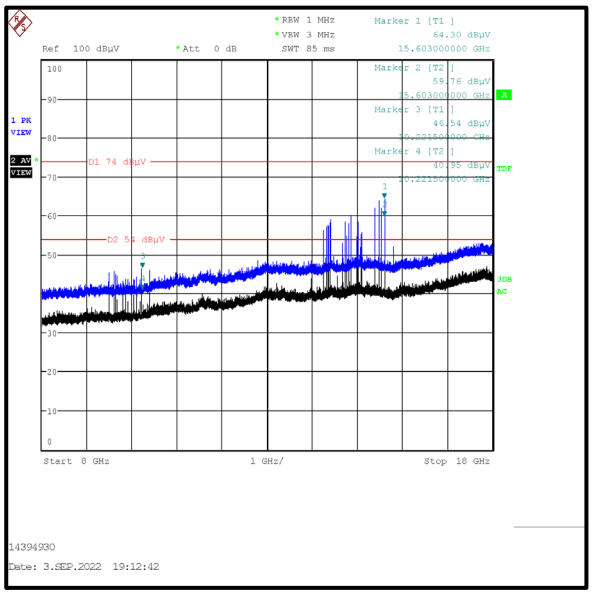
Transmitter Radiated Emissions (continued)

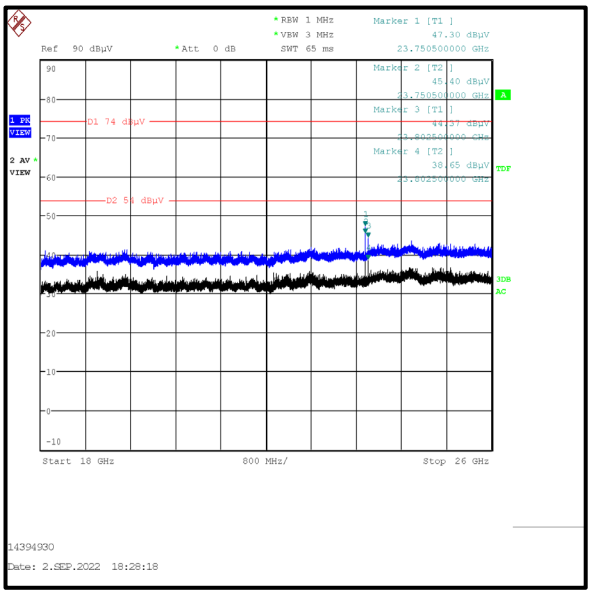
Results: Antenna 11 / Average

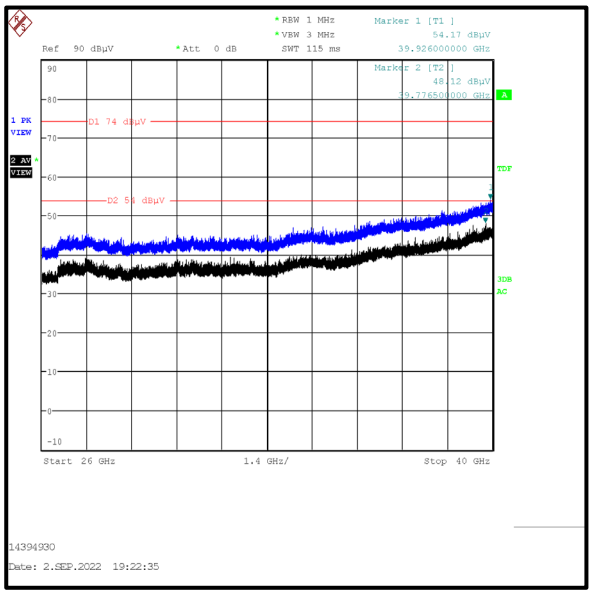
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4749.984	Vertical	43.1	54.0	10.9	Complied
5137.143	Vertical	35.7	54.0	18.3	Complied
9499.977	Vertical	33.7	54.0	20.3	Complied
14250.024	Vertical	45.8	54.0	8.2	Complied
15750.049	Vertical	38.3	54.0	15.7	Complied
23750.054	Vertical	35.3	54.0	18.7	Complied
74484.250	Vertical	43.1	54.0	10.9	Complied
85705.000	Vertical	47.7	54.0	6.3	Complied

Transmitter Radiated Emissions (continued)









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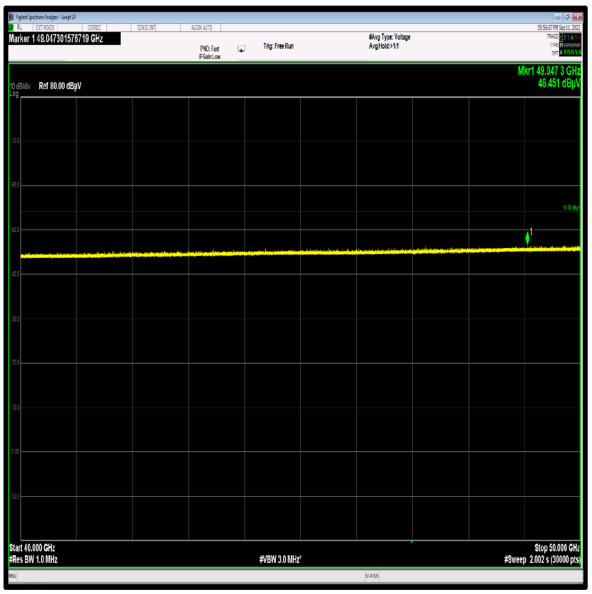
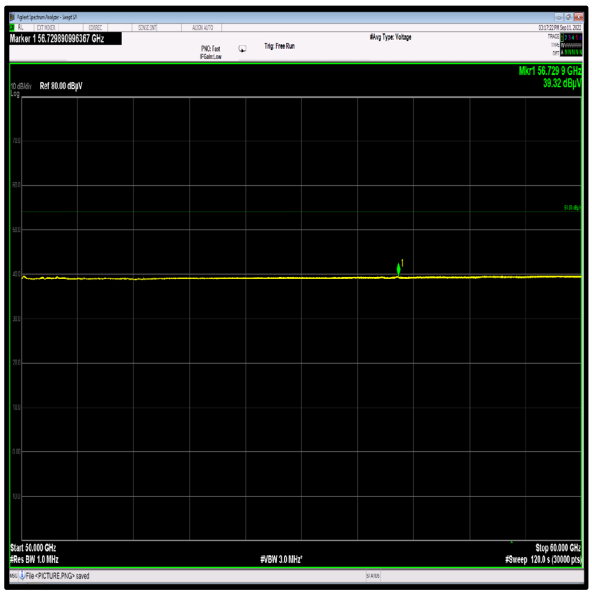
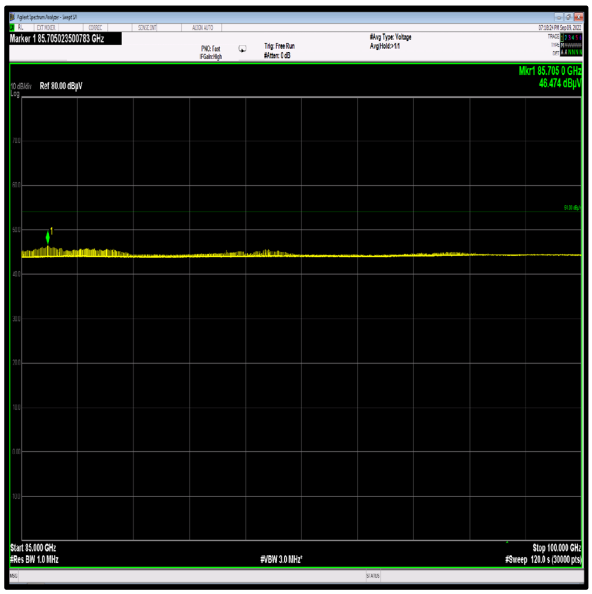
Transmitter Radiated Emissions (continued)

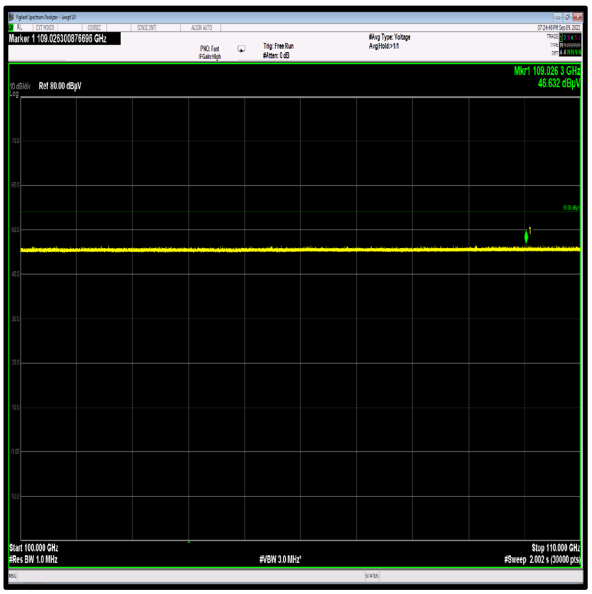






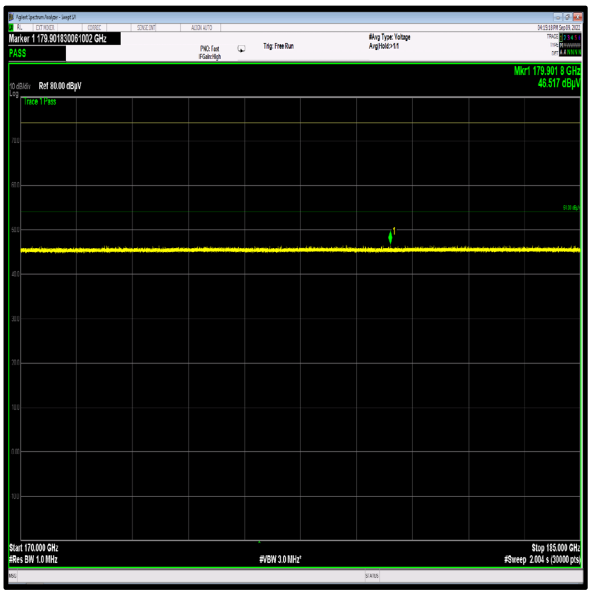
Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Emissions (continued)



Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Emissions (continued)



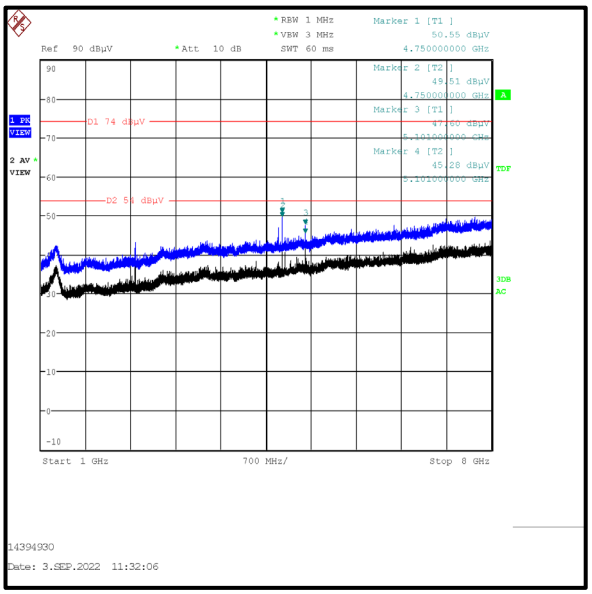
Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

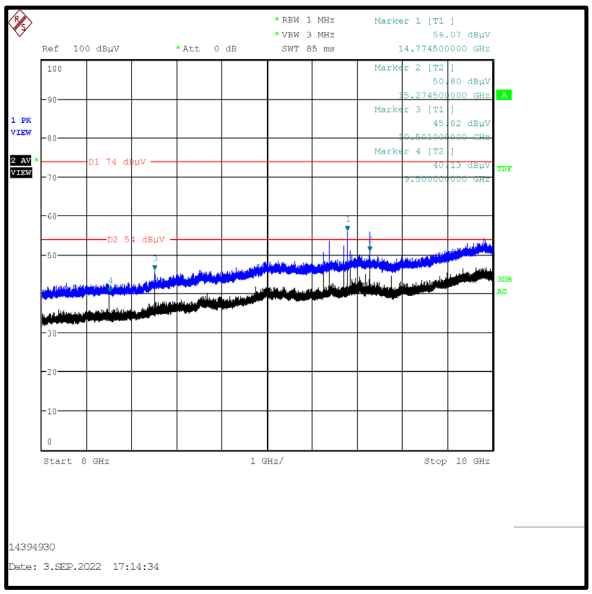
Transmitter Radiated Emissions (continued)

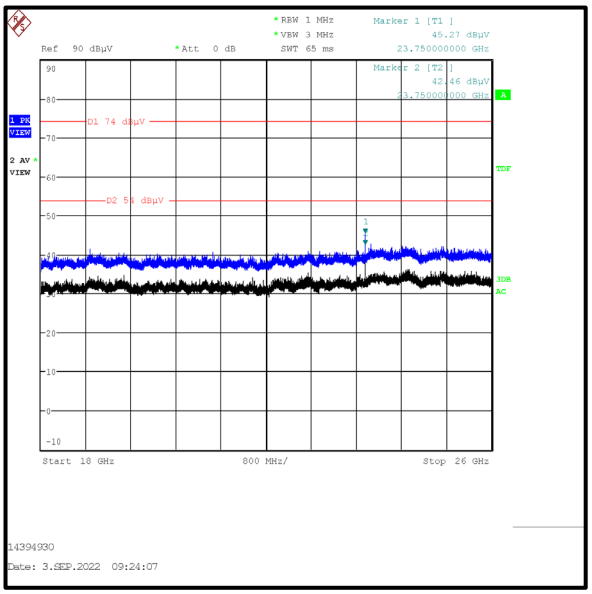
Results: Antenna 14 / Average

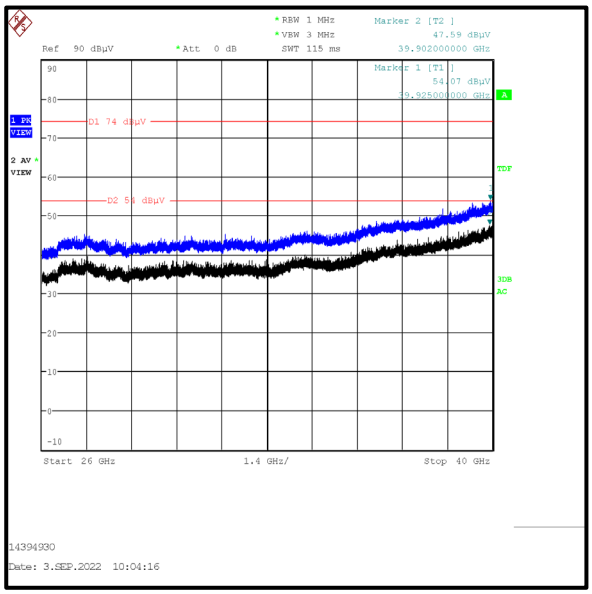
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4749.971	Vertical	39.5	54.0	14.5	Complied
5105.099	Vertical	33.9	54.0	20.1	Complied
9500.045	Vertical	35.2	54.0	18.8	Complied
10500.151	Vertical	31.7	54.0	22.3	Complied
14249.992	Vertical	42.0	54.0	12.0	Complied
15750.116	Vertical	38.5	54.0	15.5	Complied
74438.831	Vertical	42.2	54.0	11.8	Complied
85766.000	Vertical	45.1	54.0	8.9	Complied

Transmitter Radiated Emissions (continued)



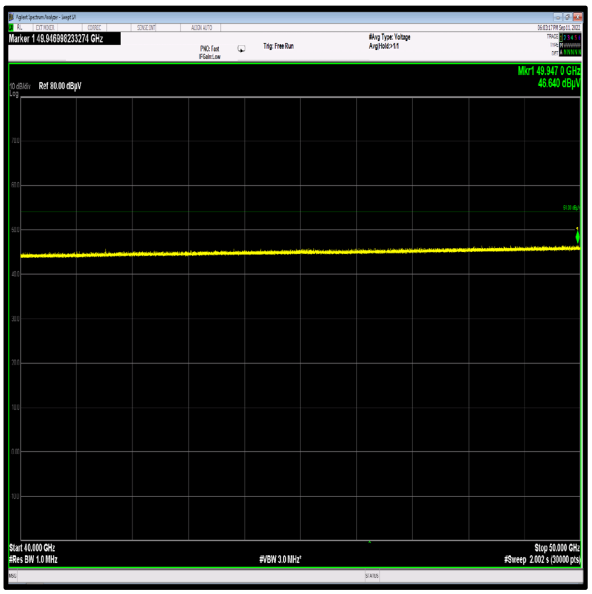


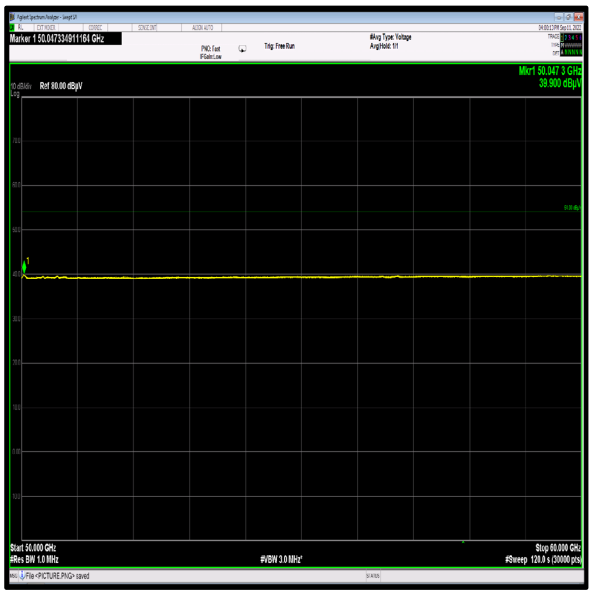




Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

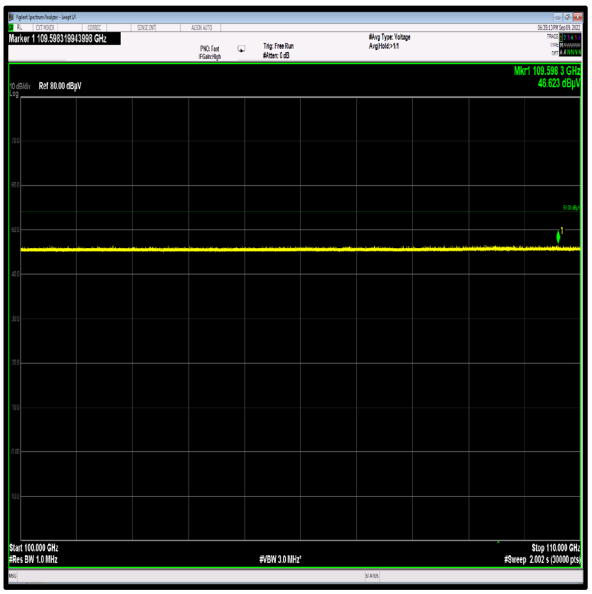
Transmitter Radiated Emissions (continued)





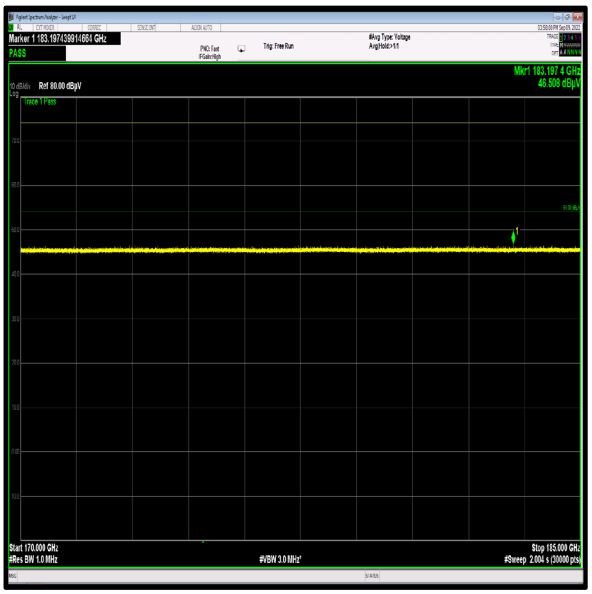
Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Emissions (continued)



Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Emissions (continued)



Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5 AC Power Line Conducted Emissions Test Results

5.1 Transmitter AC Conducted Spurious Emissions

Test Summary:

Test Engineers:	Alison Johnston & Nick Tye	**Test Dates:**	25 October 2022 & 26 October 2022
Test Sample Serial Number:	58644148		

FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10 Section 6.2 / FCC KDB 174176 and notes below

Environmental Conditions:

Temperature (°C):	24 to 25
Relative Humidity (%):	49 to 51

Note(s):

1. The EUT was connected to a benchtop DC power supply which supplied the unit with 24 VDC. The DC power supply was connected to 120 VAC 60 Hz single phase supply via a LISN.
2. A pulse limiter was fitted between the LISN and the test receiver.
3. In accordance with FCC KDB 174176 Q4, tests were performed with a 240 VAC 60 Hz single phase supply as this was within the input voltage range of the DC power supply.
4. A pulse limiter was fitted between the LISN and the test receiver.
5. Pre-scans were performed and markers placed on the highest live and neutral measured levels. Final measurements were performed on the marker frequencies and the results entered into the tables below.

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 1 / Live / Quasi Peak / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.177000	Live	19.8	64.6	44.8	Complied
10.203000	Live	14.0	60.0	46.0	Complied
10.549500	Live	12.7	60.0	47.3	Complied
17.817000	Live	20.5	60.0	39.5	Complied
24.000000	Live	25.4	60.0	34.6	Complied
26.745000	Live	10.5	60.0	49.5	Complied

Results: Antenna 1 / Live / Average / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
10.203000	Live	13.1	50.0	36.9	Complied
10.585500	Live	7.7	50.0	42.3	Complied
18.001500	Live	28.5	50.0	21.5	Complied
21.907500	Live	16.6	50.0	33.4	Complied
24.000000	Live	21.5	50.0	28.5	Complied
28.000500	Live	25.6	50.0	24.4	Complied

Results: Antenna 1 / Neutral / Quasi Peak / 120 VAC 60 Hz

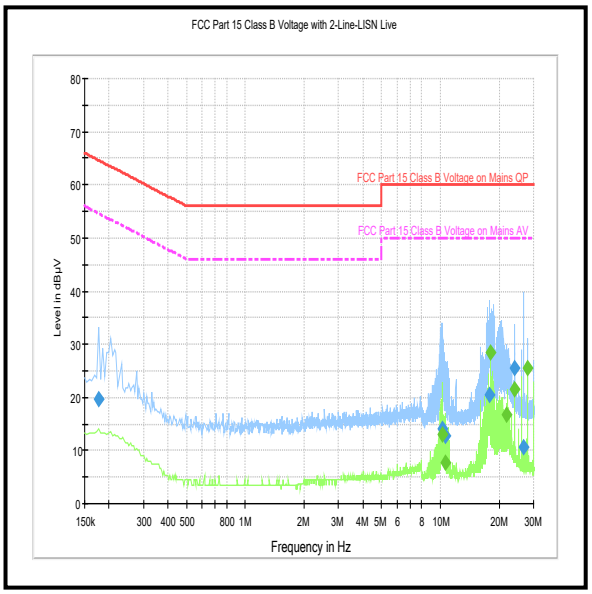
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.159000	Neutral	19.8	65.5	45.7	Complied
5.037000	Neutral	9.1	60.0	50.9	Complied
10.131000	Neutral	16.2	60.0	43.8	Complied
18.784500	Neutral	19.3	60.0	40.7	Complied
24.841500	Neutral	12.4	60.0	47.6	Complied
30.000000	Neutral	30.4	60.0	29.6	Complied

Results: Antenna 1 / Neutral / Average / 120 VAC 60 Hz

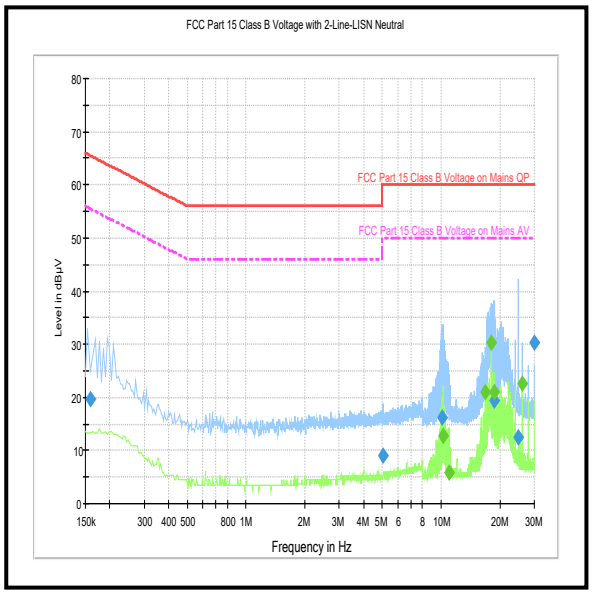
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
10.203000	Neutral	12.8	50.0	37.2	Complied
10.963500	Neutral	5.8	50.0	44.2	Complied
16.867500	Neutral	21.1	50.0	28.9	Complied
18.001500	Neutral	30.3	50.0	19.7	Complied
18.672000	Neutral	20.9	50.0	29.1	Complied
26.002500	Neutral	22.6	50.0	27.4	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 1 / 120 VAC 60 Hz



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 1 / Live / Quasi Peak / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.190500	Live	19.8	64.0	44.2	Complied
9.676500	Live	15.6	60.0	44.4	Complied
12.003000	Live	10.5	60.0	49.5	Complied
15.162000	Live	12.3	60.0	47.7	Complied
18.001500	Live	32.0	60.0	28.0	Complied
24.000000	Live	25.7	60.0	34.3	Complied

Results: Antenna 1 / Live / Average / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
9.609000	Live	11.5	50.0	38.5	Complied
15.999000	Live	19.2	50.0	30.8	Complied
18.001500	Live	29.5	50.0	20.5	Complied
19.999500	Live	28.5	50.0	21.5	Complied
24.000000	Live	20.8	50.0	29.2	Complied
28.000500	Live	26.1	50.0	23.9	Complied

Results: Antenna 1 / Neutral / Quasi Peak / 240 VAC 60 Hz

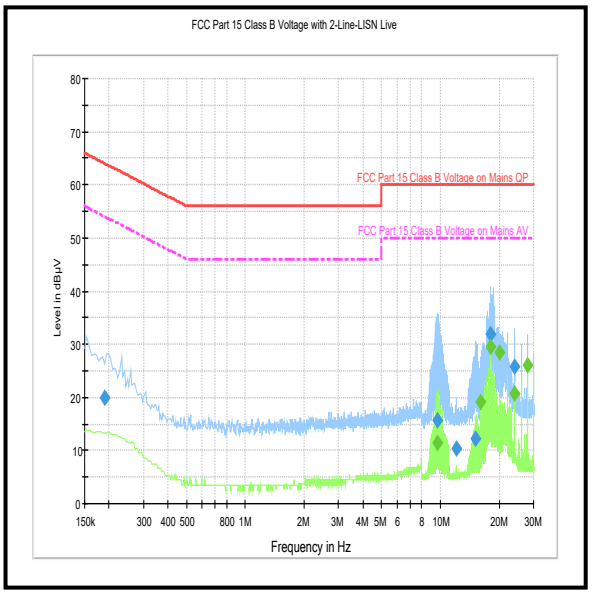
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.159000	Neutral	18.7	65.5	46.8	Complied
9.676500	Neutral	14.9	60.0	45.1	Complied
15.198000	Neutral	11.2	60.0	48.8	Complied
17.268000	Neutral	23.9	60.0	36.1	Complied
18.622500	Neutral	24.1	60.0	35.9	Complied
28.000500	Neutral	27.9	60.0	32.1	Complied

Results: Antenna 1 / Neutral / Average / 240 VAC 60 Hz

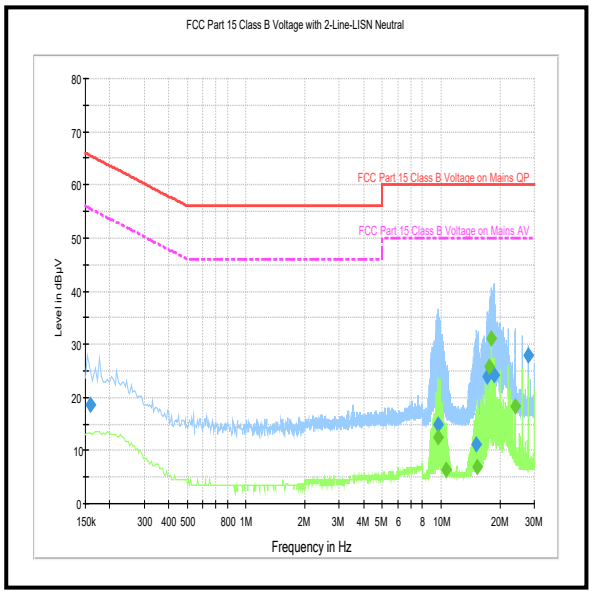
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
9.667500	Neutral	12.4	50.0	37.6	Complied
10.581000	Neutral	6.5	50.0	43.5	Complied
15.324000	Neutral	6.8	50.0	43.2	Complied
17.673000	Neutral	25.8	50.0	24.2	Complied
18.001500	Neutral	31.1	50.0	18.9	Complied
24.036000	Neutral	18.4	50.0	31.6	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 1 / 240 VAC 60 Hz



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 11 / Live / Quasi Peak / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.186000	Live	19.5	64.2	44.7	Complied
9.105000	Live	18.5	60.0	41.5	Complied
11.998500	Live	10.9	60.0	49.1	Complied
18.708000	Live	23.2	60.0	36.8	Complied
24.004500	Live	22.4	60.0	37.6	Complied
26.970000	Live	14.3	60.0	45.7	Complied

Results: Antenna 11 / Live / Average / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
9.123000	Live	11.9	50.0	38.1	Complied
10.203000	Live	5.6	50.0	44.4	Complied
11.998500	Live	6.5	50.0	43.5	Complied
18.672000	Live	25.5	50.0	24.5	Complied
24.000000	Live	22.6	50.0	27.4	Complied
28.000500	Live	25.9	50.0	24.1	Complied

Results: Antenna 11 / Neutral / Quasi Peak / 120 VAC 60 Hz

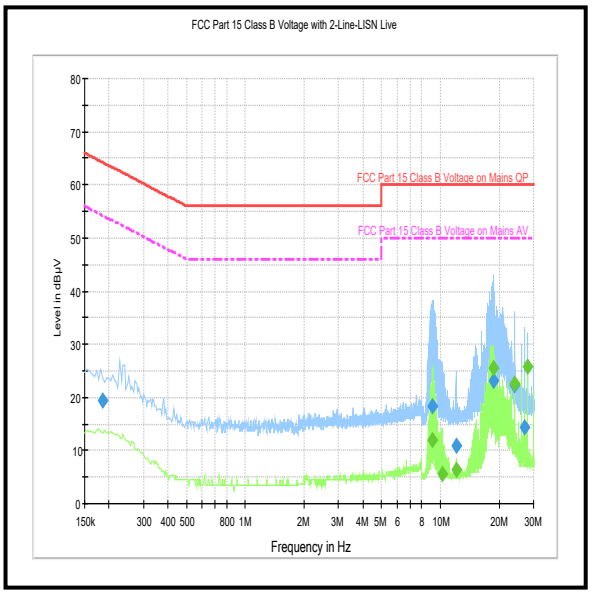
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.154500	Neutral	19.8	65.8	46.0	Complied
9.217500	Neutral	18.4	60.0	41.6	Complied
15.274500	Neutral	10.8	60.0	49.2	Complied
18.622500	Neutral	24.9	60.0	35.1	Complied
23.995500	Neutral	15.6	60.0	44.4	Complied
27.046500	Neutral	15.4	60.0	44.6	Complied

Results: Antenna 11 / Neutral / Average / 120 VAC 60 Hz

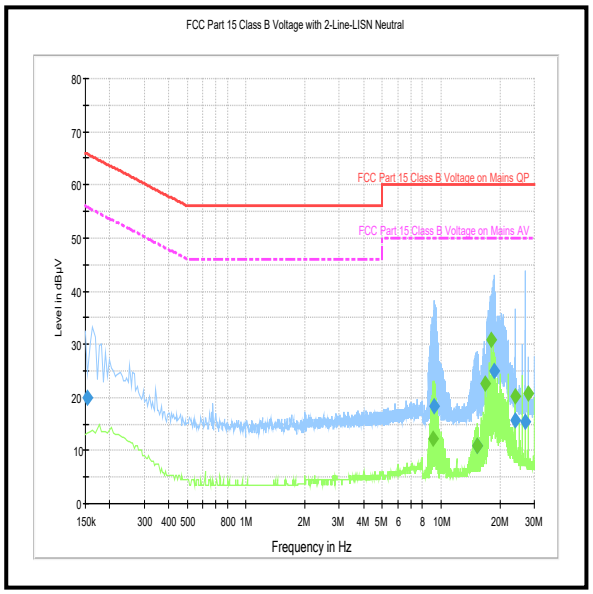
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
9.064500	Neutral	12.3	50.0	37.7	Complied
15.261000	Neutral	10.8	50.0	39.2	Complied
16.867500	Neutral	22.6	50.0	27.4	Complied
18.001500	Neutral	30.9	50.0	19.1	Complied
24.036000	Neutral	20.1	50.0	29.9	Complied
28.000500	Neutral	20.9	50.0	29.1	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 11 / 120 VAC 60 Hz



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 11 / Live / Quasi Peak / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.262500	Live	16.9	61.4	44.5	Complied
9.519000	Live	18.3	60.0	41.7	Complied
11.998500	Live	11.3	60.0	48.7	Complied
18.780000	Live	22.7	60.0	37.3	Complied
24.000000	Live	26.5	60.0	33.5	Complied
28.000500	Live	29.9	60.0	30.1	Complied

Results: Antenna 11 / Live / Average / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
9.613500	Live	8.2	50.0	41.8	Complied
10.032000	Live	6.3	50.0	43.7	Complied
15.999000	Live	16.0	50.0	34.0	Complied
18.001500	Live	30.5	50.0	19.5	Complied
19.999500	Live	23.7	50.0	26.3	Complied
24.000000	Live	21.6	50.0	28.4	Complied

Results: Antenna 11 / Neutral / Quasi Peak / 240 VAC 60 Hz

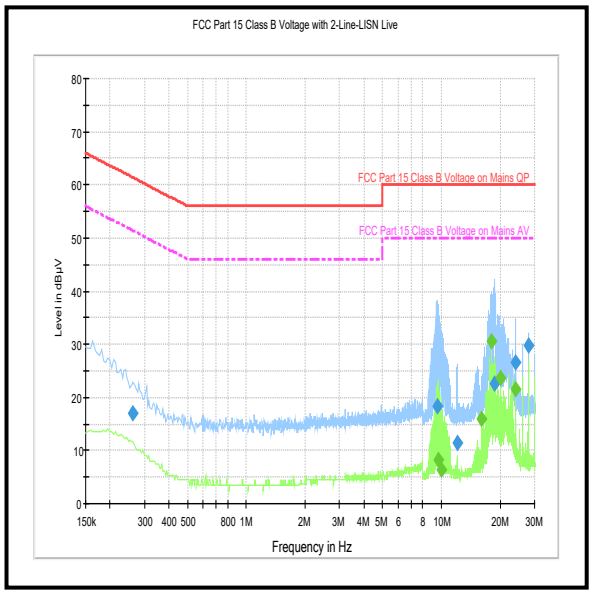
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.177000	Neutral	19.3	64.6	45.3	Complied
9.519000	Neutral	18.8	60.0	41.2	Complied
11.998500	Neutral	11.8	60.0	48.2	Complied
15.463500	Neutral	13.2	60.0	46.8	Complied
18.622500	Neutral	25.2	60.0	34.8	Complied
24.004500	Neutral	18.9	60.0	41.1	Complied

Results: Antenna 11 / Neutral / Average / 240 VAC 60 Hz

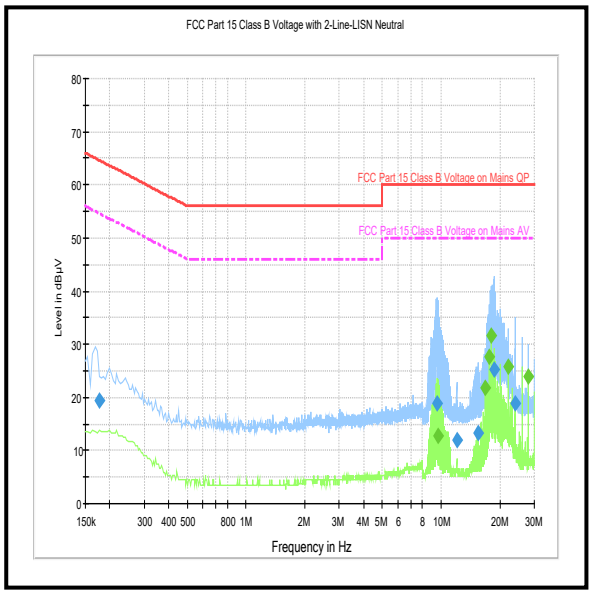
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
9.649500	Neutral	12.7	50.0	37.3	Complied
16.867500	Neutral	21.8	50.0	28.2	Complied
17.673000	Neutral	27.5	50.0	22.5	Complied
18.001500	Neutral	31.7	50.0	18.3	Complied
22.002000	Neutral	25.8	50.0	24.2	Complied
28.000500	Neutral	24.0	50.0	26.0	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 11 / 240 VAC 60 Hz



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 14 / Live / Quasi Peak / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.190500	Live	19.3	64.0	44.7	Complied
8.956500	Live	17.9	60.0	42.1	Complied
10.203000	Live	9.9	60.0	50.1	Complied
12.003000	Live	10.5	60.0	49.5	Complied
18.622500	Live	24.4	60.0	35.6	Complied
24.004500	Live	22.1	60.0	37.9	Complied

Results: Antenna 14 / Live / Average / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
8.835000	Live	11.9	50.0	38.1	Complied
10.257000	Live	7.7	50.0	42.3	Complied
15.999000	Live	18.9	50.0	31.1	Complied
18.001500	Live	29.2	50.0	20.8	Complied
22.002000	Live	22.8	50.0	27.2	Complied
28.000500	Live	26.1	50.0	23.9	Complied

Results: Antenna 14 / Neutral / Quasi Peak / 120 VAC 60 Hz

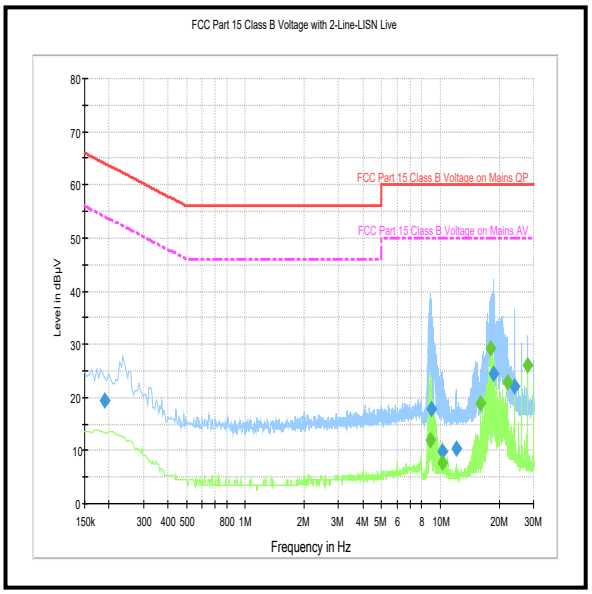
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.154500	Neutral	20.1	65.8	45.7	Complied
8.911500	Neutral	20.2	60.0	39.8	Complied
10.135500	Neutral	10.0	60.0	50.0	Complied
12.003000	Neutral	11.8	60.0	48.2	Complied
18.712500	Neutral	23.8	60.0	36.2	Complied
24.000000	Neutral	21.5	60.0	38.5	Complied

Results: Antenna 14 / Neutral / Average / 120 VAC 60 Hz

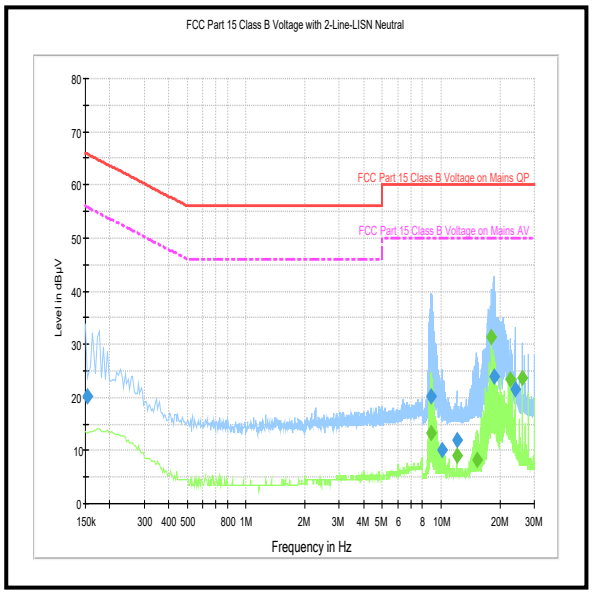
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
8.907000	Neutral	13.4	50.0	36.6	Complied
11.998500	Neutral	9.1	50.0	40.9	Complied
15.328500	Neutral	8.1	50.0	41.9	Complied
18.001500	Neutral	31.3	50.0	18.7	Complied
22.578000	Neutral	23.4	50.0	26.6	Complied
26.002500	Neutral	23.8	50.0	26.2	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 14 / 120 VAC 60 Hz



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 14 / Live / Quasi Peak / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.177000	Live	20.6	64.6	44.0	Complied
8.835000	Live	20.7	60.0	39.3	Complied
10.198500	Live	9.4	60.0	50.6	Complied
15.198000	Live	10.7	60.0	49.3	Complied
18.622500	Live	24.4	60.0	35.6	Complied
23.995500	Live	20.9	60.0	39.1	Complied

Results: Antenna 14 / Live / Average / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
8.794500	Live	12.6	50.0	37.4	Complied
9.501000	Live	7.6	50.0	42.4	Complied
15.999000	Live	17.8	50.0	32.2	Complied
18.001500	Live	30.9	50.0	19.1	Complied
22.002000	Live	24.4	50.0	25.6	Complied
28.000500	Live	27.1	50.0	22.9	Complied

Results: Antenna 14 / Neutral / Quasi Peak / 240 VAC 60 Hz

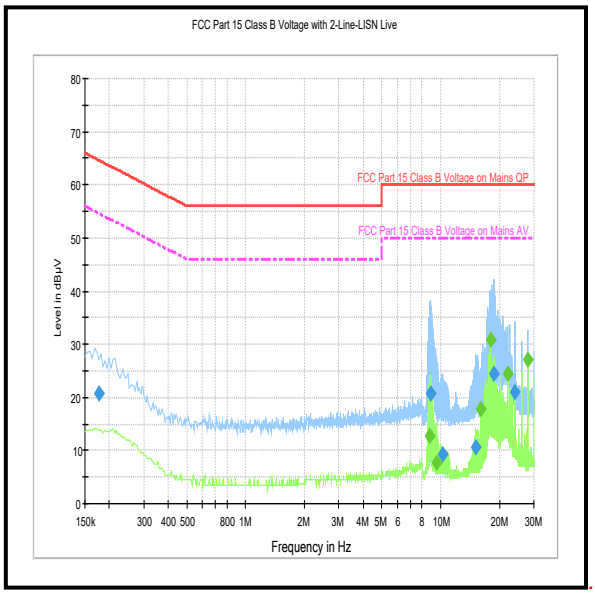
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.159000	Neutral	19.6	65.5	45.9	Complied
8.875500	Neutral	19.4	60.0	40.6	Complied
15.198000	Neutral	11.2	60.0	48.8	Complied
16.458000	Neutral	13.2	60.0	46.8	Complied
18.784500	Neutral	23.6	60.0	36.4	Complied
26.002500	Neutral	28.7	60.0	31.3	Complied

Results: Antenna 14 / Neutral / Average / 240 VAC 60 Hz

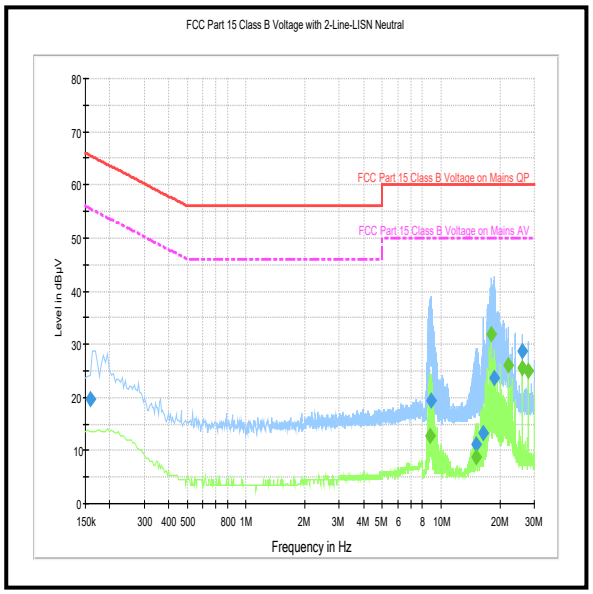
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
8.794500	Neutral	12.7	50.0	37.3	Complied
15.153000	Neutral	8.7	50.0	41.3	Complied
18.001500	Neutral	31.8	50.0	18.2	Complied
22.002000	Neutral	25.9	50.0	24.1	Complied
26.002500	Neutral	25.5	50.0	24.5	Complied
28.000500	Neutral	25.0	50.0	25.0	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: Antenna 14 / 240 VAC 60 Hz



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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